APPENDIX B
TRAVEL FORECASTING ASSUMPTIONS

Travel Forecasting Assumptions for Conformity Analysis of the 2007 Transportation Improvement Program Amendment 07-06 and Transportation 2030 Plan Amendment

This report documents the travel forecasting assumptions for the 2007 Transportation Improvement Program (TIP) Amendment 07-06 and Transportation 2030 Plan Amendment, and includes the following analysis years: 2006, 2007, 2015, 2025, and 2030. The analysis is based on the "latest planning assumptions" as documented below. In addition, the current conformity analysis also uses the latest upgrades to the MTC travel demand forecast model, which was updated and re-validated to a 2000 base year in Spring 2004.

The vehicle travel forecasts from the MTC travel demand model are then used in conjunction with the California Air Resource Board's (ARB) motor vehicle emission model (EMFAC2002) to estimate total regional on road motor vehicle emissions.

In preparing these travel forecasts, MTC uses four basic sets of assumptions:

- Pricing Assumptions;
- Travel Behavior Assumptions;
- Demographic Assumptions; and
- Highway and Transit Network Assumptions.

Demographic and detailed highway and transit network definition assumptions are not included in this appendix. The RTP travel forecasts are based on the socio-economic/land use forecast series *Projections 2005*, developed by the Association of Bay Area Governments (ABAG). These projections reflect the new regional "Smart Growth" land use assumptions and have been approved for use in the conformity analysis by the US DOT and EPA, subject to periodic preparation of a monitoring report by ABAG to examine results and review assumptions used in the projections. The projections also reflect the near term effects of the current economic slowdown on job creation in the Bay Area.

Pricing assumptions include projected parking prices; gasoline and non-gasoline auto operating costs; fuel economy; bridge tolls; and transit fares.

Travel behavior assumptions include trip peaking factors, vehicle occupancy factors, and estimates of interregional commuters.

Additional travel forecasting methodology issues are addressed in this report. These are special methodological issues related to air quality and mobile source emissions inventories. The methodology issues include:

- Commercial Vehicle Methodology;
- Speed Post-Processing Methodology;
- Distribution of VMT by Speed Methodology; and
- Adjustment of Regional VMT and Trips.

I. Pricing Assumptions

A. Parking Costs

The MTC demand models were estimated using nominal, or posted parking prices as opposed to actual parking prices. Actual parking prices would be the average parking price paid by a consumer, weighted by those who are subsidized by their employer and those who are not subsidized by their employer. For peak period parking cost, the monthly posted parking price is divided by 22 days per month to derive an average

workday parking cost. The average workday parking cost is then divided by 8 hours to derive an average peak hour parking cost per hour in 1990 cents. In the home-based work mode choice model application, the per hour charge is multiplied by 8 hours, then divided by 2, to derive a per vehicle trip charge. Next, the per vehicle trip charge is divided by the vehicle occupancy so that parking costs are equally distributed between vehicle drivers and passengers.

Base year 2000 and forecast years 2006, 2007, 2015, 2025 and 2030 peak hour parking costs, by the MTC 1454 zone system, are shown in Table 1. Off-peak per hour parking costs –2000, 2006, 2007, 2015, 2025 and 2030 – are shown in Table 2.

The MTC assumption for parking costs is that they will change, in real terms, by the ratio of the net total employment density in the target year to the net employment density in the base year (2000). This differs from previous sets of forecasting assumptions, which used a one to three percent per year growth rate, irrespective of the change in employment density. Peak and off-peak parking costs assumptions are detailed in Table 1 and Table 2, respectively. In looking at Table 1, in travel analysis zone 1, the employment density for year 2000 in San Francisco is 18,378 jobs per 15 acres and grows to 21,553 jobs per 16 acres in year 2030, reflecting a 10 percent increase in employment density. When you multiply this 10 percent growth rate to the peak parking cost of 160 cents per hour in year 2000, this results in 176 cent per hour in year 2030.

MTC staff periodically inventory parking garages throughout the Bay Area to monitor trends in parking prices. The most recent update to this inventory was conducted fall 2000.

Auto Operating Costs

The MTC travel demand models are based on non-linear auto operating costs which vary according to trip speed and distance. As speed increases, the fuel consumption rate (gallons per mile) decreases linearly. As distance increases, the share of "cold start" fuel consumption decreases. This internal model is used to derive trip-specific fuel economy (miles per gallon) which is multiplied by the per gallon gas price to derive per trip gasoline operating cost. A constant non-gasoline operating cost per mile is multiplied by trip distance to get per trip non-gas cost. Total auto operating cost per trip is the sum of the gasoline cost per trip plus the non-gasoline cost per trip plus any bridge tolls or parking charges. Details on the auto operating cost model are included in the BAYCAST Users Guide (August 2004).

The MTC auto operating cost model is based on work conducted by Cambridge Systematics, Inc., as part of the *Urban Transportation Energy Conservation* study, published in 1978 (known as "UTEC"). The UTEC models were also used to derive auto operating costs for the Southern California Association of Governments' current set of travel demand models.

The basic inputs to the BAYCAST model system, in terms of auto operating cost, are gasoline price (in 1990 constant dollars); the fuel correction factor (to represent fleet turnover and more fuel efficient vehicles); and the non-gasoline operating cost (in 1990 cents per mile.) Data on historical, 1990 to 2003, and assumed future year auto operating costs are detailed in Table 3 and Figures 1 and 2.

The notes to Table 3 indicate some of the major assumptions going into these auto operating cost forecasts. For gasoline prices, MTC uses future gas price estimates provided by the California Energy Commission (CEC) and the US Department of Energy's Energy Information Administration (EIA). These agencies predict gas prices in the range of $1.09 per gallon (CEC) to $1.38/gallon (EIA) (in 1990 constant dollars.) The current assumption for years 2005 through 2025 is that gas prices will remain at their 2000 level, that is, $1.83 per gallon in current (2000) dollars. Gas prices are reflected through December 2003. However, the gas prices for 2004 are higher than we assumed. The higher costs would suppress vehicle trips; therefore we are taking a conservative approach to the air quality analysis.

MTC is assuming no change in fuel economy relative to 1990. This respects the overall fuel economy trend as established by the US Energy Information Agency (EIA) in their "Household Vehicles Energy Consumption Report" (September 1997.) The EIA found no significant increase in overall passenger vehicle fuel economy between their national surveys conducted in 1988 and 1994. Overall this means that we are projecting that total auto operating cost per mile (gasoline + non-gasoline) will remain at 10.22 cents per mile between 2000 and 2025 (all in 1990 constant dollars).

Table 9 shows the ratio of San Francisco to Los Angeles gas prices between January 2001 and December 2003. Over this time period, San Francisco gas prices have been, on average, four percent higher than Los Angeles gas prices. This is not a significant difference, so the recommendation is to use the CEC statewide gas price forecast unadjusted for Bay Area price differential.

The other key assumption is that non-gasoline operating cost (maintenance and repair, motor oil, parts, accessories) is 40 percent of total auto operating costs. This 40 percent figure is based on US Bureau of Labor Statistics data on consumer expenditures (see Table 4 of the MTC report: *Consumer Price Indices: Bay Area & U.S. Cities: 1950-2001*.) In a typical household, between five and six percent of a household's expenditures are related to auto operating costs. Gasoline cost has fluctuated from 55.6 percent to 73.5 percent of total auto operating costs over the past twenty years.

Auto ownership costs, which now comprise around 7.3 percent of the average household's budget, are not used in determining trip running, or variable costs. Auto ownership costs includes the cost of new or used vehicle purchasing and financing, insurance premiums, and vehicle registration and licensing fees. These fixed costs of auto ownership are more important in determining the number and quality of vehicles to own or lease. Given the difficulty in projecting automobile quality and costs, household income is used as a surrogate in predicting auto ownership levels.

C. Bridge Tolls

Bay Area voters approved Regional Measure 2 on the March 2, 2004 general election. This measure increases the toll on all Bay Area state-owned bridges from $2.00 to $3.00 as of July 1, 2004. Bay Area state-owned bridge tolls are scheduled to remain at $3.00 for the duration of the long-range planning period (Table 4, Figure 3). Given an inflation assumption of 3 percent per year, a year 2025 toll of $3.00 is equivalent to 105 cents in 1990 constant dollars (Table 10). This MTC bridge toll assumption is consistent with the financial forecasting assumptions used in projecting bridge toll revenues.

Note that discounted commute tickets were phased out with the introduction of FASTRAK (electronic toll collection) in 2000 and 2001. FASTRAK tolls were also discounted by 15 percent, but these FASTRAK discounts were discontinued in early 2002.

The Golden Gate Bridge District has also introduced FASTRAK, and has also eliminated commute discounts as of June 2001.

All Bay Area bridges had a standard automobile toll of $1.00 per crossing in 1990. Commute ticket booklets offered 15 to 32 percent discounts off of the $1.00 toll, as follows:

1990 Base Year Bridge Tolls

Bay Area Bridges	Auto Toll	Commute Tickets	Commuter Toll ($/ticket)	Free Toll for SR3+ During Peak Period?
Antioch	$1.00	$27 / 40 tickets	$0.68	No
Benicia/Martinez	$1.00	$27 / 40 tickets	$0.68	No
Carquinez	$1.00	$27 / 40 tickets	$0.68	No
Richmond/San Rafael	$1.00	$34 / 40 tickets	$0.85	Yes (since 10/89)

Golden Gate	$1.00	$20 / 23 tickets	$0.87	Yes
SF/Oakland Bay	$1.00	$34 / 40 tickets	$0.85	Yes
San Mateo/Hayward	$1.00	$34 / 40 tickets	$0.85	Yes
Dumbarton	$1.00	$34 / 40 tickets	$0.85	Yes

For the state-owned bridges for FY 1989/90, MTC staff calculated an average auto toll weighted on commuter ticket usage and full toll usage, as follows:

Computation of Average Auto Toll, 1989/90

Bay Area Bridges	Commuter Tickets	Total Autos & Trailers	Tickets as % of Total	Average Auto Toll
Antioch	225,569	1,605,516	14%	$0.96
Benicia/Martinez	3,696,160	13,643,902	27%	$0.91
Carquinez	4,724,623	17,585,673	27%	$0.91
Richmond/San Rafael	1,257,179	8,428,199	15%	$0.95
SF/Oakland Bay	4,227,393	36,521,920	12%	$0.96
San Mateo/Hayward	1,845,246	12,131,171	15%	$0.95
Dumbarton	2,085,757	8,381,841	25%	$0.92

The average toll for the Golden Gate Bridge was 94 cents per revenue vehicle between July and December 1990 (source: Golden Gate Bridge District. Comparative Record of Traffic for the Month of December 1990).

For purposes of travel forecasting, the one-way toll is halved so that both directions on every bridge are allocated one-half of the total average toll. This is a technical necessity to counter the toll collection direction bias.

Note that free tolls for three-or-more person carpools were instituted on the Carquinez Strait bridges (Carquinez, Benicia/Martinez and Antioch) in October 1995. This is the only change in toll assumptions from the 1990 base year. The final tolls used in the 1990 model simulation are as follows:

Bridge Tolls for Travel Forecasting: 1990 Base Year

Bay Area Bridges	Drive Alone & Carpool-2	3+ Carpool	Off-Peak Tolls
Antioch	$0.48	$0.48 / $0.00	$0.48
Benicia/Martinez	$0.46	$0.46 / $0.00	$0.46
Carquinez	$0.48	$0.48 / $0.00	$0.48
Richmond/San Rafael	$0.48	$0.00	$0.48
Golden Gate	$0.47	$0.00	$0.47
SF/Oakland Bay	$0.48	$0.00	$0.48
San Mateo/Hayward	$0.48	$0.00	$0.48
Dumbarton	$0.46	$0.00	$0.46

D. Transit Fares

Year 2004 transit fares are used for all future year forecasts. This means that fares will increase with inflation, so that their real value is not eroded. This assumption is borne out by past fare trends, and

reflects the ongoing need for transit operators to periodically adjust their fares to keep up with increased labor costs, maintain their local contribution to capital replacement projects, and pay for increases in the cost of fuel and other supplies.

Base and top end transit fares by Bay Area transit operator, 1970 to 1998, are shown in Table 5. Changes in Bay Area transit operator fares, 1998 to 2004, are summarized in Table 13.

Historical and projected base fares are charted in Figure 4.1 (Muni), Figure 4.2 (AC Transit), and Figure 4.3 (BART). These charts show base transit fares in current and 1990 constant dollars. These charts also show modest real decreases in transit fares for Muni and BART over the 1995 to 2004 time period. The current dollar fares are based on a three percent per year increase in consumer price indices through the Plan forecast period.

Most operators have increased their fares in the past several years due to adverse economic conditions. Transit operator fares were revised to incorporate fares as of March 2004. Table 13 shows the changes in base fares, comparing the previous conformity determination for the RTP (2001 RTP) with the current analysis.

II. Travel Behavior Assumptions

A. Vehicle Peaking Factors

The MTC BAYCAST model system is oriented to the production of daily and AM peak period traffic assignments. In addition, the user can factor the two-hour peak period vehicle trip tables to peak hour tables using peak hour-to-peak period factors by trip purpose.

In contrast to the old MTCFCAST model system, the BAYCAST system directly simulates the number of AM peak period home-to-work vehicle trips, derived from the home-to-work departure time choice model. This is basically a "peak spreading" model that will predict fewer trips in the peak period when congestion levels increase. The standard approach of using fixed shares for all other trip purposes is still needed to augment this new departure time choice model.

Old-style (MTCFCAST) AM and PM peak hour vehicle peaking factors are shown in Table 6.1. New-style (BAYCAST) AM and PM peak period vehicle peaking factors are shown in Table 6.2. The AM peak period is defined as 7:00-9:00 AM. The PM peak period is defined as 4:00-6:00 PM.

As a part of the peak period traffic assignment calibration and validation process, a set of peak period calibration factors were developed. These calibration factors, documented in Table 7, reflect the subregional variation from the regional peaking factors shown in Table 6.2.

Data from the 1990 household travel survey show that the AM peak hour (07:30-08:30) is 58 percent of total vehicle trips occurring in the AM peak period (07:00-09:00) (930,038 vehicle trips / 1,610,546 vehicle trips, from Survey Working Paper #4, page 160, Table 2.3.7A.) So, a rough rule of thumb is to multiply any AM peak (two-hour) period traffic assignment by 0.58 to get a rough estimate of peak hour predicted traffic volumes.

B. Vehicle Occupancy Factors

In the old MTC model system, vehicle occupancy assumptions were important input assumptions to the home-based shop, home-based social/recreation and the non-home-based mode choice model system. These vehicle occupancy assumptions were used, and are still used, for dividing the vehicle trip cost between vehicle drivers and passengers.

All of the new mode choice models either split the number of person trips by vehicle occupancy level (i.e., drive alone, shared ride 2, shared ride 3+), or they split the in-vehicle person trips by vehicle driver and vehicle passenger modes. The issue in auto occupancy forecasting is to ensure that the input occupancy assumption is reasonably consistent with the forecasting output vehicle occupancy rate.

Historical vehicle occupancy rates, from MTC household travel surveys, and BAYCAST predicted vehicle rates for 2000 and 2030, are shown in Table 8.

For the home-based work, home-based shop and home-based social/recreation mode choice models, trips are split by occupancy level (DA, SR2, SR3+). For the three home-based school mode choice models and non-home-based trips, person trips are split into vehicle driver and vehicle passenger. For home-based grade school trips, vehicle driver is not an available mode. This means that the vehicle driver trip for escorting children to school is typically included as a home-based shop/other shared ride 2 or shared ride 3+ trip; the vehicle passenger (the child) is classified as a home-based grade school vehicle passenger trip.

This is complex, but reflects the nature of travel: where persons in a particular vehicle may be traveling to different activities. For example, the parent's trip purpose is to escort the child to school (home-based shop/other); the child's trip purpose is to attend school (home-based school).

Historical and projected vehicle occupancy factors are shown in Table 8. Note that these are not assumptions per se but model simulations.

C. Interregional Commuters

Assumptions about the number of interregional commuters is key in two respects: first, intraregional home-based work productions and attractions need to be adjusted to reflect in-commuting and out-commuting from and to Bay Area jobs and households; second, interregional vehicle trips are needed to augment the intraregional trips included in the standard BAYCAST travel demand models. Interregional trips were updated to reflect Census 2000 journey-to-work data and commuter sketch planning forecasts.

Interregional commuters are estimated by factoring the Census 2000 journey-to-work data file using a 46-by-46 matrix that comprises the 34 Bay Area superdistricts and the 12 Bay Area neighbor counties. These sketch planning commuter forecasts are prepared for the years 2010, 2020 and 2030 and interpolated for intermediate conformity analysis years. The factored year 2030 interregional commuter matrix is used as the basis for estimating background interregional year 2030 daily and peak period vehicle trips. This is basically a "sketch planning" effort to complement the formal models used to predict intraregional personal and intraregional commercial travel. These interregional commuter forecasts are documented in the report "Commuter Forecasts for the San Francisco Bay Area: 1990-2030 (Based on ABAG Projections 2003): Data Summary" published May 2004.

III. Demographic Assumptions

MTC used ABAG's Projections 2005 forecasts (adopted November 2004) for future year population and employment assumptions and for the geographic distributions of residents and jobs throughout the region. For use in MTC's travel demand model, MTC combines and allocates ABAG's tract-level forecasts to MTC's 1454 regional travel analysis zone system for all years.

IV. Transportation Network Assumptions

A major part of the 2007 TIP Amendment 07-06 and Transportation 2030 Plan Amendment conformity analysis is the definition of highway, transit, and pedestrian/bicycle networks for various analysis years. These networks describe the supply of transportation capacity and various service

characteristics that influence travel behavior. The 2006 and 2007 transportation network reflects the projects in the TIP that will be operational in 2006 and 2007. The 2015, 2025, and 2030 networks reflect approved sales tax projects in November 2004 that were shifted into the financially constrained element of Transportation 2030 Plan. Projects assumed in the transportation network for the various analysis years are listed in Appendices B of the conformity report.

Transit operator service levels have significantly changed between 2000 and 2004, due to the economic decline and the need to reduce service on some routes. The most extensive service level changes were to SamTrans and AC Transit District (Newark, Union City routes), Golden Gate and SCVTA. In the most recent conformity analysis (Transportation 2030 Plan and 2005 TIP/Amendment #05-05), 2004 service levels are used in the baseline networks. The transit network used in the forecasting assumptions for this conformity analysis has not changed from the Transportation 2030 Plan and 2005 TIP/Amendment #05-05 conformity analysis conformity analysis.

V. Commercial Vehicle Methodology

The MTC BAYCAST commercial vehicle models are based on the truck trip generation models developed for Caltrans and Alameda County as part of the 1992 I-880 Intermodal Corridor Study; and truck trip distribution models documented in the 1996 report "Quick Response Freight Manual" produced by the US Department of Transportation (usable truck trip distribution models were not developed for the I-880 Intermodal Corridor Study).

These truck models are specifically limited to larger trucks of six-or-more tires. There are three sub-purposes to the MTC truck models: 1. "Small Trucks" (two-axle, six-tire vehicles); 2. "Medium Trucks" (three-axle vehicles); and 3. "Combination Trucks" (four-or-more axle vehicles).

Beginning in 2004, MTC has introduced a "very small, two-axle four-tire" commercial vehicle truck trip purpose. The "very small truck" trip model is borrowed from the Phoenix, Arizona MPO, as documented in the FHWA "Quick Response Freight Manual." Before 2004, these very small truck trips were indirectly estimated by increasing non-home-based vehicle trips.

The following sidebar summarizes the MTC BAYCAST truck trip generation and distribution models, including the very small truck trip models:

Garage-Based Truck Trip Production Models
Two-Axle Truck Productions = 0.011 * MFGEMP + 0.014 * RETEMP + 0.0105 * SEREMP + 0.046 * OTHEMP
Three-Axle Truck Productions = 0.0014 * MFGEMP + 0.00012 * RETEMP + 0.0037 * OTHEMP
Four-+-Axle Truck Productions = 0.0044 * MFGEMP + 0.0027 * SEREMP + 0.0084 * OTHEMP

Garage-Based Truck Trip Attraction Models
Two-Axle Truck Attractions = 0.0234 * TOTEMP
Three-Axle Truck Attractions = 0.0046 * TOTEMP
Four-+-Axle Truck Attractions = 0.0136 * TOTEMP

Non-Garage-Based Truck Trip Production & Attraction Models
Two-Axle Truck Productions and Attractions = 0.0324 * TOTEMP
Three-Axle Truck Productions and Attractions = 0.0039 * TOTEMP
Four-+-Axle Truck Productions and Attractions = 0.0073 * TOTEMP

Very Small Truck Trip Production & Attraction Models
Productions = 0.251 * TOTHH + 1.110 * AGREMP + 0.938 * MFGEMP +
0.938 * TRDEMP + 0.888 * RETEMP + 0.437 * SEREMP + 0.663 * OTHEMP2
Where:
MFGEMP = Manufacturing Employment
RETEMP = Retail Employment
SEREMP = Service Employment
OTHEMP = Other Employment (Wholesale Trade, Agriculture/Mining, Other)

AGREMP = Agricultural + mining Employment
TRDEMP = Wholesale Trade Employment
OTHEMP2 = Other Employment (Agriculture/Mining + Other)
TOTEMP = Total Employment
TOTHH = Total Households

Truck Trip Distribution Models: Gravity Models based on AM Peak Period Travel Time
Two-Axle Truck Trip Distribution Friction Factor: $FF_{ij} = \exp(-0.08 * TT_{ij})$
Three-Axle Truck Trip Distribution Friction Factor: $FF_{ij} = \exp(-0.1 * TT_{ij})$
Four-+-Axle Truck Trip Distribution Friction Factor: $FF_{ij} = \exp(-0.03 * TT_{ij})$
Very Small Truck Trip Distribution Friction Factor: Built off of NHB trip distribution model

In terms of mobile source emissions inventories, the MTC estimates of mobile source emissions are based on the "default" vehicle type and vehicle technology mix assumed by the California Air Resources Board (CARB) in their EMFAC/BURDEN model series. The CARB assumptions on vehicle type mix are based on the same Caltrans databases and truck counts as used by MTC in model validation, only adjusted by CARB staff to conform to the weight-based vehicle classes needed as input to the EMFAC emission factor models.

VI. Speed Post-Processing Methodology

The MTC BAYCAST models were updated and re-validated to a 2000 base year in Spring 2004. A major part of this effort was the validation of traffic assignments to observed daily traffic volumes, and observed AM peak period traffic volumes and speeds on Bay Area freeways. The model validation work is summarized in an MTC data summary: "2000 Base Year Validation of Travel Demand Models for the San Francisco Bay Area" (May 2004).

Previous conformity analyses required a speed post-processing methodology to correct for overly fast expressway and arterial speeds. This speed post-processing methodology has been eliminated in the current set of forecasts, and replaced with a consistent set of speeds used in all model components. What was formerly the "post-processing" methodology is now the "main processing" methodology. This means that reduced free-flow arterial and expressway speeds that were only incorporated in a post-processing traffic assignment stage are now used throughout the MTC model system: as inputs to the trip distribution, mode choice, as well as traffic assignment stages.

The standard set of speed-flow models used in the MTC model system includes an MTC variation on the "BPR" curve, and application of the "Akçelik" speed-flow curve documented in previous MTC research. The "MTC Breakdown Curve" is used for freeways and freeway-to-freeway segments; the "Akçelik Curve" is used for expressways, collectors, freeway ramps, major arterials and metered ramps.

MTC assumptions of per lane capacity and free-flow speed are "lookup" tables based on facility type (freeway, major arterial, etc.) and area type (rural, suburban, etc.) Area types are based on "area density," a combined measure of population and employment density. Current and former sets of free-flow speeds are shown in Table 11.

The following box summarizes the MTC standard and post-processing set of speed-flow models.

MTC Standard & Post-Processing Set of Speed-Flow Models

MTC Breakdown Curve (Freeways & Freeway-to-Freeway Facilities)
$t = t_o * (1 + 0.20 * ((x)/0.75)^6)$

Akçelik Curve (All Other Facilities)
$t = t_o + \{0.25 * T * [(x-1) + ((x-1)^2 + (16 * Ja * L^2/T^2))^0.5]\}$

where:
t = average travel time per unit distance (hours/mile)

t_o = free-flow travel time per unit distance (hours/mile)
T = flow period, i.e., the time interval in hours during which an average arrival (demand) flow rate, v, persists
Q = capacity
x = the degree of saturation, i.e., v/Q
Ja = the delay parameter (Expressway = 0.2, Collector=1.2, Freeway Ramp=0.17, Major Arterial=0.4, Metered Ramp=0.2)
Ja = the delay parameter (Post-Processing = calculated for each facility type, area type combination, where: Ja = (Tc – To)^2 / L^2 and "Tc" is the critical speed at V/C ratio of 1.0)
L = Link length (miles)

VII. Adjustment of Regional VMT and Trips Methodology

Regional VMT and engine starts (needed for emission calculations) are forecasted using a combination of output from MTC's travel demand forecasting model and base year (1999) VMT information provided by the California Air Resources Board (ARB). The ARB base year VMT comes from the State Bureau of Automotive Repair's (BAR) biennial inspection/maintenance odometer records for registered Bay Area vehicles. MTC then "grows" this VMT consistent with the growth in VMT projected in MTC's regional travel model forecasts.

The BAR-based VMT will over-estimate Bay Area VMT by including Bay Area-registered vehicle travel occurring outside the nine-county region. The BAR-based VMT method will also not include Bay Area VMT by non-resident vehicular travel occurring inside the nine-county region. ARB considers that these anomalies offset each other, and that the resulting regional VMT level is a conservatively high value. In comparison, MTC estimates 140,116 thousand VMT per weekday in year 2000. The 1999 ARB estimates, based on BAR inspection/maintenance data, showed 157,359 thousand VMT per weekday. For conformity purposes, MTC agreed to follow ARB's protocol for estimating VMT. Using MTC growth estimation data, the 1999 ARB VMT estimate was adjusted to establish a new 2000 ARB baseline VMT estimate for mobile source emission inventory calculations in the Bay Area. MTC calculated that the ARB estimated VMT in year 2000 is 164,073. For comparative purposes, below is a table showing the differences in MTC and ARB's VMT estimates from the 2001 RTP and 2007 TIP Amendment 07-06 and Transportation 2030 Plan Amendment.

Base Year 2000, Average Weekday Daily VMT

	2001 RTP	**2007 TIP Amendment**
ARB	159,642*	164,073
MTC	134, 256	140,116
% Difference	-16%	-15%

*Source: San Francisco Bay Area-EMFAC2000

MTC used the 2000 ARB baseline VMT of 164,073 to develop VMT estimates for the remaining analysis years – 2006, 2007, 2015, 2025, 2030. Annual compounded growth rates were then updated and applied to generate regional VMT totals for this conformity analysis.

Regional VMT Growth Rates for the 2007 TIP Amendment 07-06 and Transportation 2030 Plan Amendment Conformity Analysis

Analysis Year Time Frame	Percentage Change
2000-2006	**5.01%**
2006-2007	**1.04%**
2007-2015	**11.88%**
2015-2025	**12.33%**
2025-2030	**6.32%**

Regional engine starts (which generate event-specific emissions) are based on ARB's estimate of approximately 6.72 to 6.75 engine starts per vehicle per day. This 6.75 engine starts per day value is based on a small-scale survey of instrumented Sacramento-area vehicles conducted by ARB. This contrasts to other Bay Area, California and National surveys that show trip rates ranging from 2.5 to 3.5 vehicle trips per vehicle per day. For more discussion on this engine starts per vehicle issue, refer to the November 24, 1999 letter from the MTC to the California Air Resources Board. ARB and MTC have also agreed to continue working on this issue.

VIII. Distribution of VMT by Speed Methodology

An important input to ARB's EMFAC 2002, V2.2 mobile source emissions inventory model are county-level files of the share of vehicle miles travel by speed cohort, by time of day. Data is needed for 13 speed cohorts and 6 time-of-day periods (0000-0600, 0600-0900, 0900-1200, 1200-1500, 1500-1800 and 1800-2400). Regional totals of VMT by the 13 speed cohorts for 2000, 2015, and 2030 are summarized and charted in Table 12. These VMT values include intra-zonal VMT and terminal distance VMT.

It is important to note that these speeds are extracted from the post-processed highway assignments and represent average link speeds. They do not represent the range of actual traffic speeds that may be represented in average link speeds. For example, a 25 mile per hour average link speed on a freeway segment is very congested and represents "stop-and-go" conditions with speeds ranging from 0 to 65 miles per hour. The same 25 mile per hour average link speed on an arterial segment may represent a fairly "steady state" speed on a signal coordinated arterial system.

The first step in preparing the VMT-by-speed share file is the preparation of daily traffic assignments. The daily vehicle trips output from the last mode choice model iteration are split into AM-plus-PM peak period vehicle trips, and off-peak period vehicle trips. The peak period vehicle trips, representing the six peak hours, are assigned "all-or-nothing" to the MTC regional highway network using the post-processed congested speeds. The off-peak period vehicle trips, representing the 18 off-peak hours, are also assigned "all-or-nothing" to the same MTC regional highway network using free-flow speeds.

The "loaded" highway network with AM peak period and daily traffic assignment results are then exported into text files and subsequently imported into SAS (Statistical Analysis System) for further post-processing. Daily assignment volumes are then multiplied by link distance to yield vehicle miles of travel (VMT) by link, which are in turn summarized at the county-of-occurrence by speed-cohort level.

There are three components of regional VMT: interzonal VMT that is assigned to highway networks; intra-zonal VMT that is not assigned to highway networks; and terminal distance VMT that is not assigned to highway networks.

Intra-zonal vehicle trips are not assigned to highway networks. The VMT associated with intra-zonal vehicle trips is derived by exporting the intra-zonal vehicle trips and intra-zonal door-to-door distance data into a format compatible with SAS, and for merging with the daily traffic assignment SAS files. Intra-zonal VMT is approximately 7.2 to 7.5 percent of regional VMT in 2000 and in future years. SAS routines are then used to apply the "terminal distance" vehicle miles of travel to the inter-zonal and intra-zonal VMT. "Terminal distance" VMT is defined as the amount of travel from the "average household" or "average activity location" in a travel analysis zone to the nearest highway link represented in the regional highway networks.

These speed distributions were then applied to passenger cars (PC), light-duty trucks (T1, T2), medium-duty trucks (T3), and motorcycles (mcy) in EMFAC 2002. EMFAC2002 model defaults were used on all other vehicle types and times of day.

Table 1
Peak Parking Cost Assumptions by Bay Area Regional Travel Analysis Zones
Peak Period Parking Costs in 1990 cents per hour

zone	City	Neighborhood	2000	2006	2007	2015	2025	2030	Annual Percent Change, 2000-2030
1	San Francisco	Financial District	160	161	162	176	172	176	0.3%
2	San Francisco	Financial District	160	160	162	176	184	187	0.5%
3	San Francisco	Union Square	160	159	159	176	184	188	0.5%
4	San Francisco	Financial District	140	141	142	153	152	155	0.3%
5	San Francisco	Union Square	140	139	140	162	171	175	0.7%
6	San Francisco	Tenderloin	110	129	130	138	141	142	0.9%
7	San Francisco	Tenderloin	150	169	172	202	209	213	1.2%
8	San Francisco	Tenderloin	85	87	88	99	104	107	0.8%
9	San Francisco	Civic Center	70	68	69	77	81	84	0.6%
10	San Francisco	South of Market	65	74	76	84	87	88	1.0%
11	San Francisco	South of Market	85	97	98	111	112	114	1.0%
12	San Francisco	South of Market	130	133	135	153	169	178	1.1%
13	San Francisco	South of Market	130	133	134	149	164	173	1.0%
14	San Francisco	South of Market	145	148	149	162	178	185	0.8%
15	San Francisco	South of Market	145	148	150	164	179	187	0.9%
16	San Francisco	South of Mission	120	126	129	146	150	156	0.9%
17	San Francisco	South of Mission	80	83	85	96	101	106	0.9%
18	San Francisco	South of Mission	70	72	73	82	87	90	0.8%
19	San Francisco	South of Mission	60	62	64	70	74	78	0.9%
20	San Francisco	South of Mission	60	60	62	69	70	73	0.7%
21	San Francisco	South of Mission	90	91	93	106	110	112	0.7%
22	San Francisco	Embarcadero	140	148	151	163	166	168	0.6%
23	San Francisco	East of Telegraph Hill	120	126	128	135	135	137	0.4%
24	San Francisco	Jackson Square	170	172	174	182	187	189	0.4%
25	San Francisco	Chinatown	170	139	140	146	148	149	-0.4%
26	San Francisco	Chinatown	170	173	174	182	185	186	0.3%
27	San Francisco	Chinatown	170	143	144	150	152	153	-0.4%
28	San Francisco	Nob Hill	110	92	92	98	100	100	-0.3%
29	San Francisco	Nob Hill	110	110	110	118	120	121	0.3%
30	San Francisco	Civic Center	70	71	71	83	94	101	1.2%
31	San Francisco	Polk Gulch	70	73	74	85	94	98	1.1%
32	San Francisco	Polk Gulch	70	70	71	75	79	80	0.4%
33	San Francisco	Polk Gulch	70	71	72	75	72	74	0.2%
34	San Francisco	Polk Gulch	60	46	46	49	54	56	-0.2%
35	San Francisco	Russian Hill	80	88	91	103	104	104	0.9%
36	San Francisco	North Beach	125	127	128	133	127	131	0.2%
37	San Francisco	North Beach	125	126	127	134	139	142	0.4%
38	San Francisco	North Beach	80	81	81	86	93	95	0.6%
39	San Francisco	North Beach	80	81	82	86	100	110	1.1%
40	San Francisco	Fisherman's Wharf	80	86	88	94	98	100	0.7%
41	San Francisco	Fisherman's Wharf	80	82	82	88	88	88	0.3%

Table 1
Peak Parking Cost Assumptions by Bay Area Regional Travel Analysis Zones
Peak Period Parking Costs in 1990 cents per hour

zone	City	Neighborhood	2000	2006	2007	2015	2025	2030	Annual Percent Change, 2000-2030
44	San Francisco	Western Addition	55	50	51	55	54	53	-0.1%
45	San Francisco	Western Addition	0	0	0	0	0	0	NA
46	San Francisco	Western Addition	55	54	55	60	49	51	-0.3%
47	San Francisco	Western Addition	0	0	0	0	0	0	NA
48	San Francisco	Western Addition	0	0	0	0	0	0	NA
49	San Francisco	Western Addition	0	0	0	0	0	0	NA
72	San Francisco	Western Addition	0	0	0	0	0	0	NA
73	San Francisco	Western Addition	50	49	49	54	60	58	0.5%
74	San Francisco	Western Addition	25	24	25	27	27	27	0.3%
75	San Francisco	Western Addition	50	49	49	53	48	50	0.0%
76	San Francisco	Western Addition	55	55	55	59	55	58	0.2%
77	San Francisco	Western Addition	55	54	55	60	62	62	0.4%
78	San Francisco	Western Addition	55	53	53	57	87	112	2.4%
79	San Francisco	Hayes Valley	70	69	69	73	75	75	0.2%
80	San Francisco	Hayes Valley	55	45	45	49	60	69	0.8%
81	San Francisco	Buena Vista	35	34	34	37	40	42	0.6%
82	San Francisco	Buena Vista	35	35	35	37	36	36	0.1%
84	San Francisco	Buena Vista	35	35	36	39	43	36	0.1%
85	San Francisco	Buena Vista	55	54	54	58	65	70	0.8%
94	San Francisco	Castro	0	0	0	0	0	0	NA
99	San Francisco	Mission District	0	0	0	0	0	0	NA
100	San Francisco	Mission District	0	0	0	0	0	0	NA
101	San Francisco	Mission District	0	0	0	0	0	0	NA
102	San Francisco	Mission District	0	0	0	0	0	0	NA
103	San Francisco	Mission District	0	0	0	0	0	0	NA
104	San Francisco	Mission District	0	0	0	0	0	0	NA
105	San Francisco	Mission District	35	37	37	42	42	42	0.6%
106	San Francisco	Mission District	35	35	35	39	40	41	0.5%
107	San Francisco	Mission District	35	35	35	38	40	40	0.4%
109	San Francisco	Mission District	50	60	61	70	77	82	1.7%
257	San Mateo	Downtown	0	0	0	0	0	0	NA
258	San Mateo	Downtown	0	0	0	0	0	0	NA
259	San Mateo	Downtown	0	0	0	0	0	0	NA
260	San Mateo	Downtown	0	0	0	0	0	0	NA
314	Redwood City	Downtown	0	0	0	0	0	0	NA
315	Redwood City	Downtown	0	0	0	0	0	0	NA
316	Redwood City	Downtown	0	0	0	0	0	0	NA
326	Redwood City	Downtown	0	0	0	0	0	0	NA
347	Palo Alto	Downtown	9	9	9	10	10	10	0.4%
354	Palo Alto	Downtown	17	17	17	18	18	18	0.2%
355	Palo Alto	Downtown	17	17	17	18	18	18	0.2%

Table 1
Peak Parking Cost Assumptions by Bay Area Regional Travel Analysis Zones
Peak Period Parking Costs in 1990 cents per hour

zone	City	Neighborhood	2000	2006	2007	2015	2025	2030	Annual Percent Change, 2000-2030
356	Palo Alto	Downtown	17	17	17	18	16	16	-0.2%
546	San Jose	Downtown	18	20	20	23	25	26	1.2%
549	San Jose	Downtown	43	43	44	57	83	104	3.0%
556	San Jose	Downtown	33	34	35	40	44	47	1.2%
557	San Jose	Downtown	33	34	35	40	44	48	1.3%
558	San Jose	Downtown	45	46	47	55	61	68	1.4%
560	San Jose	Downtown	29	30	31	41	58	72	3.1%
945	Oakland	Downtown	55	57	57	62	64	66	0.6%
946	Oakland	Downtown	30	32	32	34	35	36	0.6%
967	Oakland	Downtown	30	31	32	34	35	36	0.6%
968	Oakland	Downtown	55	57	57	62	64	66	0.6%
969	Oakland	Downtown	55	56	57	60	60	60	0.3%
970	Oakland	Downtown	55	57	58	67	72	75	1.0%
971	Oakland	Downtown	55	57	57	62	67	71	0.9%
980	Oakland	Downtown	30	30	31	33	35	36	0.6%
981	Oakland	Downtown	55	65	66	72	79	82	1.3%
1007	Berkeley	Downtown	96	101	101	101	104	105	0.3%
1008	Berkeley	Downtown	96	97	97	98	99	100	0.1%
1018	Berkeley	Downtown	96	99	99	101	103	104	0.3%
1019	Berkeley	Downtown	96	98	99	101	102	102	0.2%
1020	Berkeley	Downtown	96	97	97	98	100	100	0.1%
1021	Berkeley	Downtown	50	51	51	51	52	52	0.1%
1027	Berkeley	Downtown	50	50	51	52	53	54	0.3%

Note: Zones are from MTC's 1,454 regional travel analysis zone system.

Table 2
Off-Peak Parking Cost Assumptions by Bay Area Regional Travel Analysis Zones
Off-Peak Period Parking Costs in 1990 cents per hour

zone	City	Neighborhood	2000	2006	2007	2015	2025	2030	Annual Percent Change, 2000-2030
1	San Francisco	Financial District	525	528	532	577	566	577	0.3%
2	San Francisco	Financial District	525	526	530	577	603	614	0.5%
3	San Francisco	Union Square	525	521	523	577	605	618	0.5%
4	San Francisco	Financial District	230	232	233	251	250	255	0.3%
5	San Francisco	Union Square	230	229	231	266	280	288	0.8%
6	San Francisco	Tenderloin	400	469	472	503	511	515	0.8%
7	San Francisco	Tenderloin	440	495	505	592	612	625	1.2%
8	San Francisco	Tenderloin	325	333	336	380	397	409	0.8%
9	San Francisco	Civic Center	115	112	113	126	133	138	0.6%
10	San Francisco	South of Market	200	229	233	260	267	272	1.0%
11	San Francisco	South of Market	190	216	219	249	250	255	1.0%
12	San Francisco	South of Market	570	585	593	671	739	781	1.1%
13	San Francisco	South of Market	570	582	589	654	720	758	1.0%
14	San Francisco	South of Market	600	612	619	672	735	767	0.8%
15	San Francisco	South of Market	600	613	620	677	741	775	0.9%
16	San Francisco	South of Mission	390	411	420	475	487	507	0.9%
17	San Francisco	South of Mission	350	363	371	419	444	463	0.9%
18	San Francisco	South of Mission	200	206	210	233	248	256	0.8%
19	San Francisco	South of Mission	165	171	175	191	204	213	0.9%
20	San Francisco	South of Mission	165	166	169	190	194	201	0.7%
21	San Francisco	South of Mission	260	263	270	307	319	324	0.7%
22	San Francisco	Embarcadero	385	408	414	447	456	463	0.6%
23	San Francisco	East of Telegraph Hill	300	315	320	338	337	343	0.4%
24	San Francisco	Jackson Square	550	558	561	590	605	613	0.4%
25	San Francisco	Chinatown	250	204	206	215	218	219	-0.4%
26	San Francisco	Chinatown	250	255	256	268	272	274	0.3%
27	San Francisco	Chinatown	250	210	212	221	224	225	-0.4%
28	San Francisco	Nob Hill	400	334	336	357	363	365	-0.3%
29	San Francisco	Nob Hill	400	399	402	429	436	439	0.3%
30	San Francisco	Civic Center	95	96	97	113	128	137	1.2%
31	San Francisco	Polk Gulch	95	99	100	115	127	133	1.1%
32	San Francisco	Polk Gulch	95	96	96	102	107	109	0.5%
33	San Francisco	Polk Gulch	75	76	77	80	77	79	0.2%
34	San Francisco	Polk Gulch	75	57	58	61	68	70	-0.2%
35	San Francisco	Russian Hill	80	88	91	103	104	104	0.9%
36	San Francisco	North Beach	175	178	180	186	178	184	0.2%
37	San Francisco	North Beach	175	176	177	188	195	198	0.4%
38	San Francisco	North Beach	330	333	335	356	383	392	0.6%
39	San Francisco	North Beach	330	335	338	356	413	453	1.1%
40	San Francisco	Fisherman's Wharf	260	280	285	306	317	325	0.7%
41	San Francisco	Fisherman's Wharf	400	408	412	439	441	440	0.3%

Table 2
Off-Peak Parking Cost Assumptions by Bay Area Regional Travel Analysis Zones
Off-Peak Period Parking Costs in 1990 cents per hour

zone	City	Neighborhood	2000	2006	2007	2015	2025	2030	Annual Percent Change, 2000-2030
44	San Francisco	Western Addition	75	69	69	75	73	72	-0.1%
45	San Francisco	Western Addition	75	74	75	81	88	93	0.7%
46	San Francisco	Western Addition	75	74	74	82	67	69	-0.3%
47	San Francisco	Western Addition	90	88	89	99	91	97	0.2%
48	San Francisco	Western Addition	90	88	89	99	97	122	1.0%
49	San Francisco	Western Addition	90	88	89	99	93	108	0.6%
72	San Francisco	Western Addition	81	79	80	86	95	94	0.5%
73	San Francisco	Western Addition	90	88	89	96	108	105	0.5%
74	San Francisco	Western Addition	86	84	85	92	92	93	0.3%
75	San Francisco	Western Addition	90	88	89	95	86	90	0.0%
76	San Francisco	Western Addition	90	89	90	96	90	94	0.1%
77	San Francisco	Western Addition	90	88	90	98	102	102	0.4%
78	San Francisco	Western Addition	90	86	87	93	143	183	2.4%
79	San Francisco	Hayes Valley	90	88	89	94	97	96	0.2%
80	San Francisco	Hayes Valley	85	69	69	75	93	107	0.8%
81	San Francisco	Buena Vista	50	48	49	53	57	59	0.6%
82	San Francisco	Buena Vista	50	49	50	53	51	51	0.1%
84	San Francisco	Buena Vista	50	50	51	55	61	52	0.1%
85	San Francisco	Buena Vista	85	83	84	90	101	109	0.8%
94	San Francisco	Castro	45	43	43	49	40	43	-0.2%
99	San Francisco	Mission District	50	61	62	69	57	60	0.6%
100	San Francisco	Mission District	50	49	49	55	59	60	0.6%
101	San Francisco	Mission District	50	46	46	52	51	53	0.2%
102	San Francisco	Mission District	50	49	49	55	62	68	1.0%
103	San Francisco	Mission District	45	43	43	50	55	55	0.7%
104	San Francisco	Mission District	45	43	44	57	56	58	0.8%
105	San Francisco	Mission District	50	53	53	60	61	60	0.6%
106	San Francisco	Mission District	50	50	50	55	57	58	0.5%
107	San Francisco	Mission District	50	49	50	55	57	58	0.5%
109	San Francisco	Mission District	100	119	122	141	153	164	1.7%
257	San Mateo	Downtown	20	20	21	24	26	27	1.0%
258	San Mateo	Downtown	20	21	21	24	27	29	1.2%
259	San Mateo	Downtown	20	20	20	23	25	25	0.7%
260	San Mateo	Downtown	20	20	21	23	27	29	1.2%
314	Redwood City	Downtown	9	9	9	10	10	10	0.4%
315	Redwood City	Downtown	9	9	9	10	11	11	0.7%
316	Redwood City	Downtown	9	10	10	10	12	12	1.0%
326	Redwood City	Downtown	9	9	9	10	10	10	0.4%
347	Palo Alto	Downtown	31	31	31	33	34	34	0.3%
354	Palo Alto	Downtown	61	60	61	63	64	64	0.2%
355	Palo Alto	Downtown	61	61	61	64	64	65	0.2%

Table 2
Off-Peak Parking Cost Assumptions by Bay Area Regional Travel Analysis Zones
Off-Peak Period Parking Costs in 1990 cents per hour

zone	City	Neighborhood	2000	2006	2007	2015	2025	2030	Annual Percent Change, 2000-2030
356	Palo Alto	Downtown	61	62	62	65	59	59	-0.1%
546	San Jose	Downtown	113	123	127	143	156	164	1.2%
549	San Jose	Downtown	73	73	74	96	142	176	3.0%
556	San Jose	Downtown	92	95	97	111	123	132	1.2%
557	San Jose	Downtown	92	95	97	111	124	133	1.2%
558	San Jose	Downtown	194	199	204	236	264	293	1.4%
560	San Jose	Downtown	92	95	97	129	185	230	3.1%
945	Oakland	Downtown	120	124	125	136	140	145	0.6%
946	Oakland	Downtown	75	79	79	84	88	90	0.6%
967	Oakland	Downtown	75	78	79	84	88	89	0.6%
968	Oakland	Downtown	120	124	125	136	139	144	0.6%
969	Oakland	Downtown	120	123	124	132	131	132	0.3%
970	Oakland	Downtown	120	125	127	145	157	163	1.0%
971	Oakland	Downtown	120	123	124	134	146	155	0.9%
980	Oakland	Downtown	120	121	122	131	141	145	0.6%
981	Oakland	Downtown	120	143	144	157	172	179	1.3%
1007	Berkeley	Downtown	32	34	34	34	35	35	0.3%
1008	Berkeley	Downtown	32	32	32	33	33	33	0.1%
1018	Berkeley	Downtown	59	61	61	62	63	64	0.3%
1019	Berkeley	Downtown	26	27	27	27	28	28	0.2%
1020	Berkeley	Downtown	26	26	26	27	27	27	0.1%
1021	Berkeley	Downtown	32	32	32	33	33	33	0.1%
1027	Berkeley	Downtown	32	32	32	33	34	34	0.2%

Note: Zones are from MTC's 1,454 regional travel analysis zone system.

Table 3
Historical and Projected Auto Operating Costs, 1990 - 2030 (Revised March 2006)

Year	Retail Gas Price (Current $)	CPI	Annual Inflation	Gas Price (1990$)	Fuel Correction Factor	Fuel Economy (MPG)	Gasoline Operating Cost (¢/mi) (1990$)	Non-Gas Operating Cost (¢/mi) (1990$)	Total Auto Operating Cost (¢/mi) (1990$)
1990	$1.241	132.1		$1.241	1.000	21.9	5.67 ¢/mi	3.05 ¢/mi	8.72 ¢/mi
1991	$1.197	137.9	4.4%	$1.147	1.000	21.9	5.24 ¢/mi	3.43 ¢/mi	8.67 ¢/mi
1992	$1.302	142.5	3.3%	$1.207	1.000	21.9	5.51 ¢/mi	3.57 ¢/mi	9.08 ¢/mi
1993	$1.299	146.3	2.7%	$1.173	1.000	21.9	5.36 ¢/mi	3.70 ¢/mi	9.06 ¢/mi
1994	$1.275	148.7	1.6%	$1.133	1.000	21.9	5.17 ¢/mi	3.45 ¢/mi	8.62 ¢/mi
1995	$1.286	151.6	2.0%	$1.121	1.000	21.9	5.12 ¢/mi	3.57 ¢/mi	8.69 ¢/mi
1996	$1.434	155.1	2.3%	$1.221	1.000	21.9	5.58 ¢/mi	3.47 ¢/mi	9.05 ¢/mi
1997	$1.448	160.4	3.4%	$1.193	1.000	21.9	5.45 ¢/mi	3.63 ¢/mi	9.08 ¢/mi
1998	$1.304	165.5	3.2%	$1.041	1.000	21.9	4.75 ¢/mi	3.17 ¢/mi	7.92 ¢/mi
1999	$1.514	172.5	4.2%	$1.159	1.000	21.9	5.29 ¢/mi	3.53 ¢/mi	8.82 ¢/mi
2000	$1.832	180.2	4.5%	$1.343	1.000	21.9	6.13 ¢/mi	4.09 ¢/mi	10.22 ¢/mi
2001	$1.800	189.9	5.4%	$1.252	1.000	21.9	5.72 ¢/mi	3.81 ¢/mi	9.53 ¢/mi
2002	$1.599	193.0	1.6%	$1.094	1.000	21.9	5.00 ¢/mi	3.33 ¢/mi	8.33 ¢/mi
2003	$1.933	196.4	1.8%	$1.300	1.000	21.9	5.94 ¢/mi	3.96 ¢/mi	9.89 ¢/mi
2004	$2.165	198.8	1.2%	$1.439	1.000	21.9	6.57 ¢/mi	4.38 ¢/mi	10.95 ¢/mi
2005	$2.522	202.7	2.0%	$1.644	1.000	21.9	7.50 ¢/mi	5.00 ¢/mi	12.51 ¢/mi
2006	$2.430	208.2	2.7%	$1.542	1.000	21.9	7.04 ¢/mi	4.69 ¢/mi	11.74 ¢/mi
2007	$2.335	213.8	2.7%	$1.443	1.000	21.9	6.59 ¢/mi	4.39 ¢/mi	10.98 ¢/mi
2010	$2.358	231.6	2.7%	$1.345	1.000	21.9	6.14 ¢/mi	4.09 ¢/mi	10.24 ¢/mi
2015	$2.694	264.6	2.7%	$1.345	1.000	21.9	6.14 ¢/mi	4.09 ¢/mi	10.24 ¢/mi
2020	$3.078	302.3	2.7%	$1.345	1.000	21.9	6.14 ¢/mi	4.09 ¢/mi	10.24 ¢/mi
2025	$3.516	345.4	2.7%	$1.345	1.000	21.9	6.14 ¢/mi	4.09 ¢/mi	10.24 ¢/mi
2030	$4.017	394.6	2.7%	$1.345	1.000	21.9	6.14 ¢/mi	4.09 ¢/mi	10.24 ¢/mi
2000-2005	**$1.975**	**193.5**	**2.7%**	**$1.345**					
Inflation Assumption (2005 - 2030) =						*2.7%*			

Notes:
1. Future gas price of $1.343 (1990 dollars) is equivalent to $1.83/gallon in 2000 current dollars.
2. Future non-gasoline operating cost based on assumption that it is 60% of auto gasoline cost.
3. No change in overall fleet fuel economy is assumed. This respects the no change in fuel economy trend shown by the US Energy Information Agency (EIA) in their "Household Vehicles Energy Consumption Report" (September 1997).
4. Future year estimates prepared 3/20/2006

Figure 1
Auto Operating Costs (Cents/Mile)
Gasoline and Non-Gasoline Operating Costs, 1990-2030

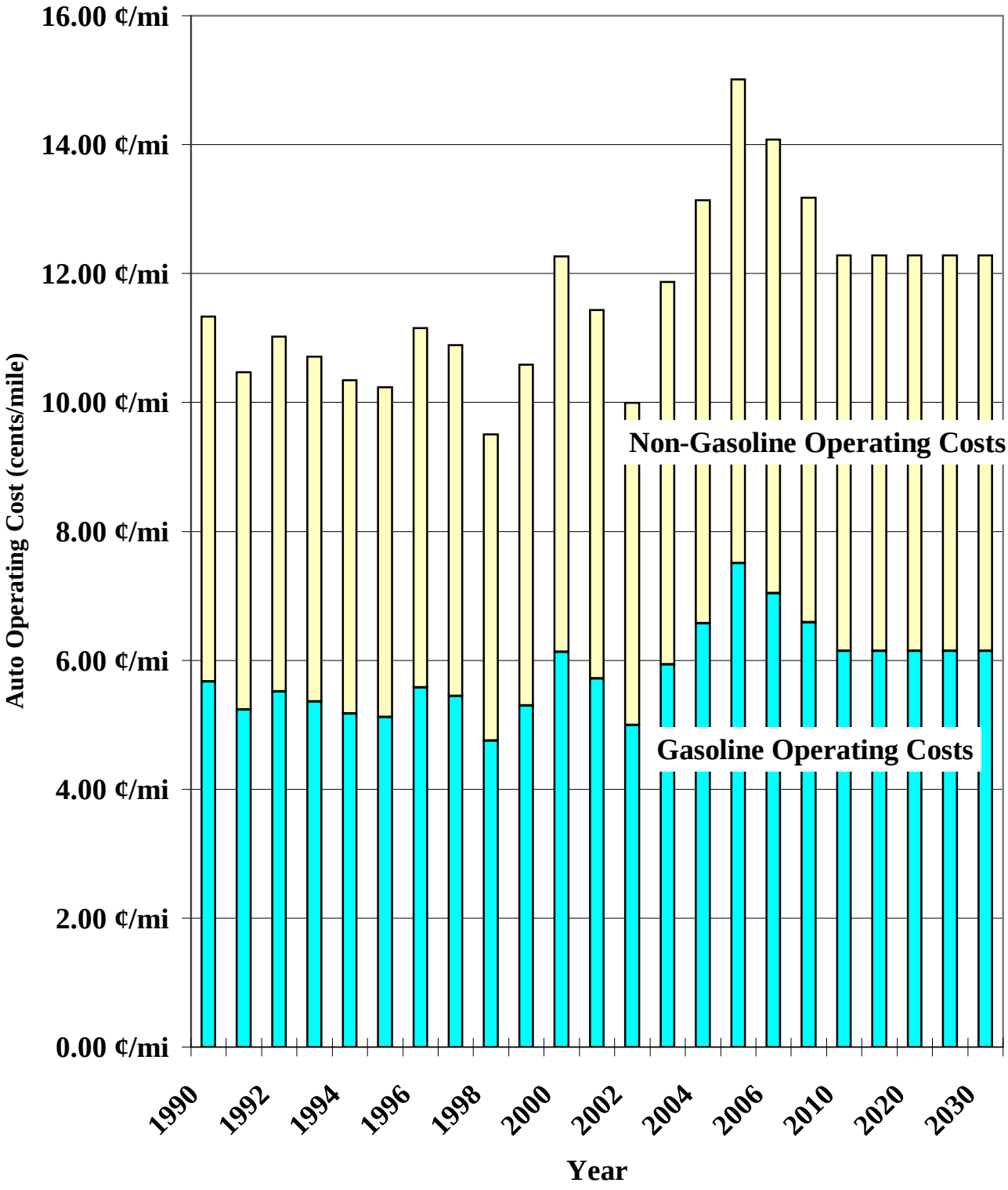

Figure 2
San Francisco Bay Area Gasoline Prices - 1990-2030
Current Dollars and 1990 Constant Dollars

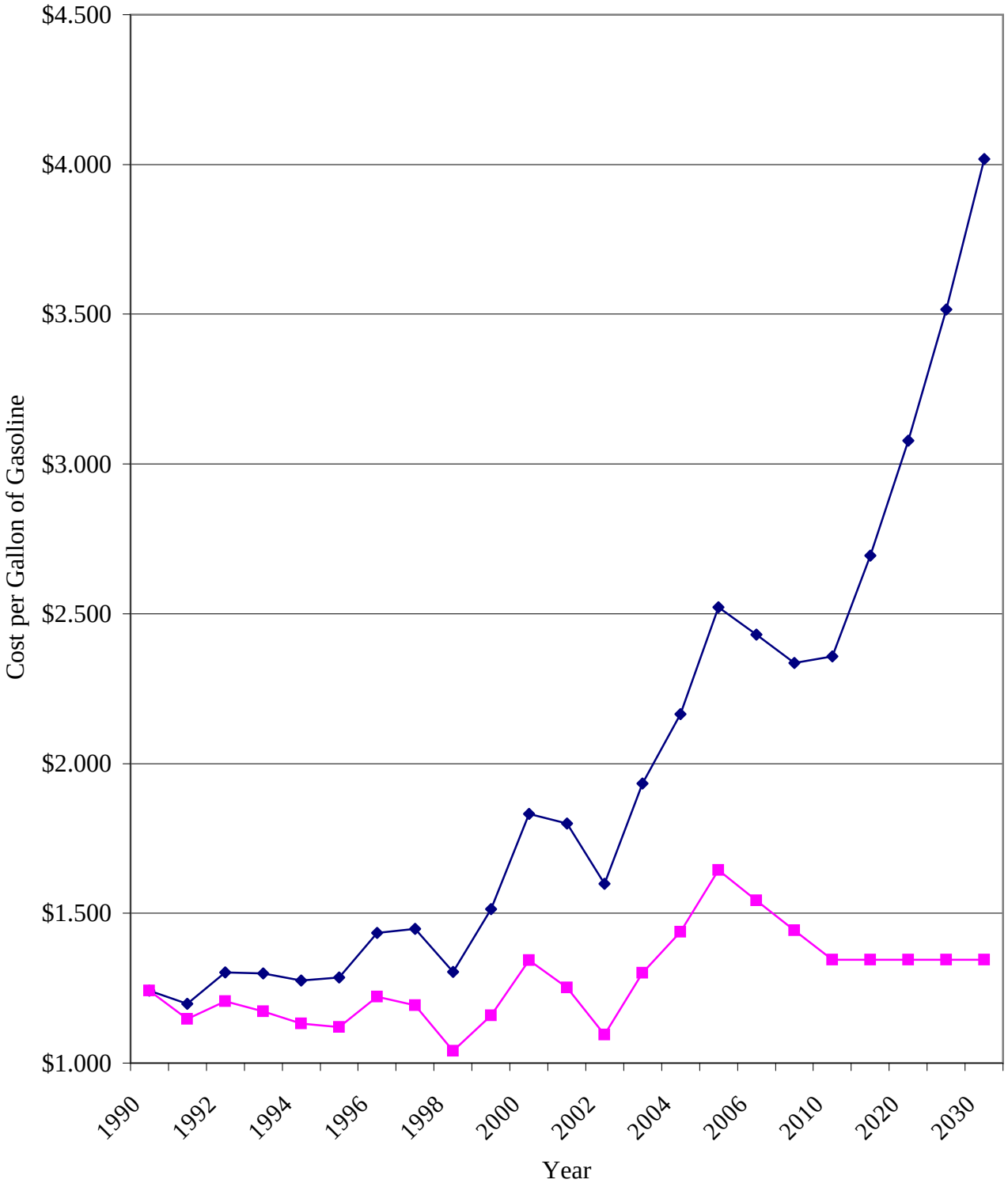

Table 4
Impact of Inflation on Bay Bridge Tolls, 1975 - 2030

Year	CPI-U All Items	San Francisco/Oakland Bay Bridge Toll (current $)	(1990 $)
1975	159.1	50¢	41.5¢
1976	168.0	50¢	39.3¢
1977	180.8	75¢	54.8¢
1978	197.8	75¢	50.1¢
1979	214.6	75¢	46.2¢
1980	247.3	75¢	40.1¢
1981	279.0	75¢	35.5¢
1982	300.0	75¢	33.0¢
1983	302.5	75¢	32.8¢
1984	319.8	75¢	31.0¢
1985	333.1	75¢	29.7¢
1986	343.2	75¢	28.9¢
1987	354.7	75¢	27.9¢
1988	370.4	75¢	26.7¢
1989	388.5	100¢	34.0¢
1990	132.1	100¢	100.0¢
1991	137.9	100¢	95.8¢
1992	142.5	100¢	92.7¢
1993	146.3	100¢	90.3¢
1994	148.7	100¢	88.8¢
1995	151.6	100¢	87.1¢
1996	155.1	100¢	85.2¢
1997	160.4	100¢	82.4¢
1998	165.5	200¢	159.6¢
1999	172.5	200¢	153.2¢
2000	180.2	200¢	146.6¢
2001	189.9	200¢	139.1¢
2002	193.0	200¢	136.9¢
2003	196.4	300¢	201.8¢
2004	198.8	300¢	199.3¢
2005	202.7	300¢	195.5¢
2006	208.2*	300¢	190.4¢
2007	213.8*	300¢	185.4¢
2008	219.6*	300¢	180.5¢
2009	225.5*	300¢	175.7¢
2010	231.6*	300¢	171.1¢
2011	237.8*	300¢	166.6¢
2012	244.3*	300¢	162.2¢
2013	250.9*	300¢	158.0¢
2014	257.6*	300¢	153.8¢
2015	264.6*	300¢	149.8¢
2016	271.7*	300¢	145.8¢
2017	279.1*	300¢	142.0¢
2018	286.6*	300¢	138.3¢
2019	294.3*	300¢	134.6¢
2020	302.3*	300¢	131.1¢
2021	310.4*	300¢	127.7¢
2022	318.8*	300¢	124.3¢
2023	327.4*	300¢	121.0¢
2024	336.3*	300¢	117.9¢
2025	345.4*	300¢	114.8¢
2026	354.7*	300¢	111.7¢
2027	364.3*	300¢	108.8¢
2028	374.1*	300¢	105.9¢
2029	384.2*	300¢	103.2¢
2030	394.6*	300¢	100.4¢

* Assumes 2.7% per year annual inflation

Figure 3
Bay Bridge Tolls
1990 and Current Dollars

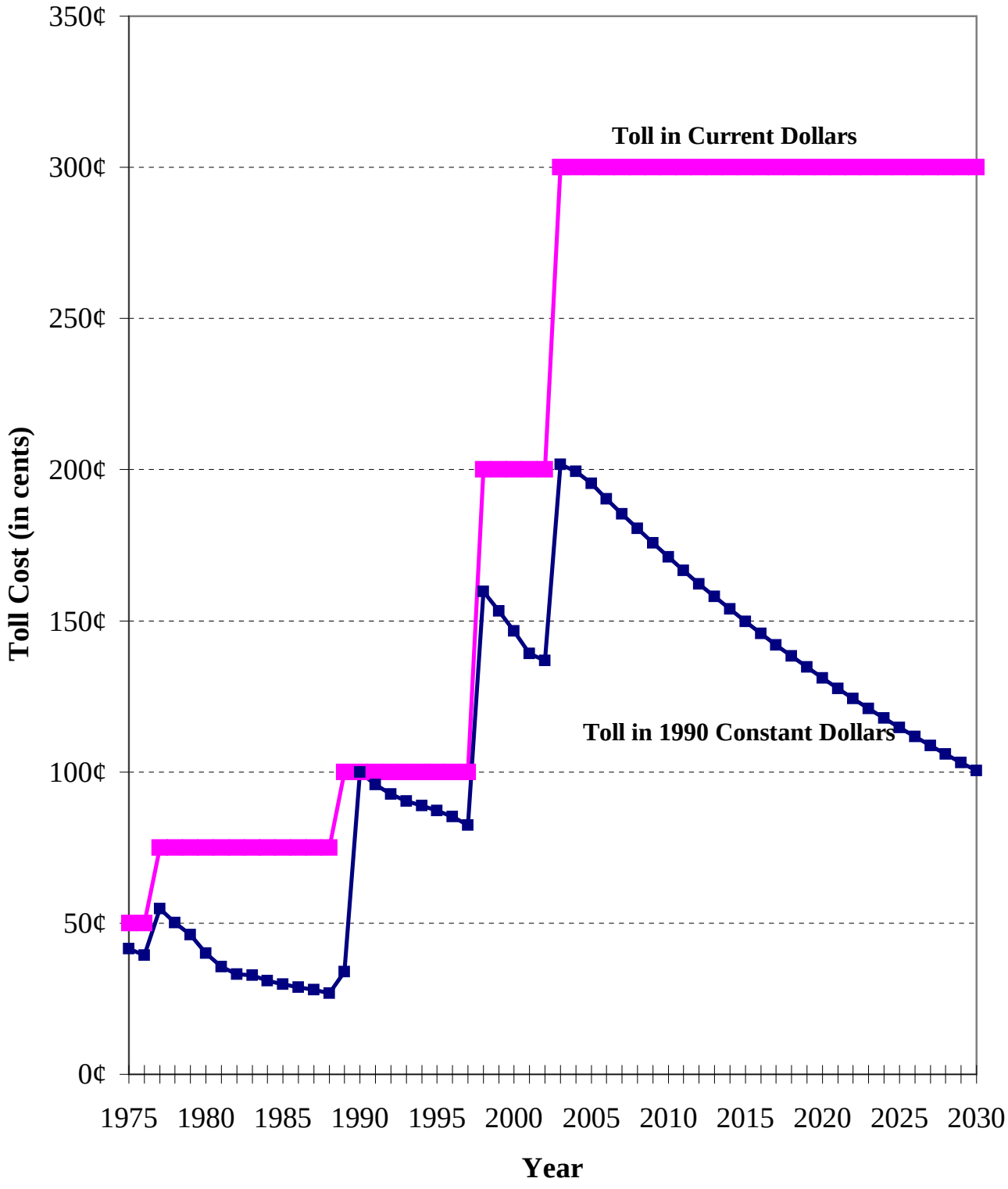

Table 5
History of Transit Fares in Bay Area, 1970-1998

	MUNI	AC Transit	BART Trains	BART Bus	SCVTA	SamTrans	GGBHTD Bus	GGBHTD Ferry	CalTrain	CCCTA	Vallejo Bus	Vallejo Ferry	AMTRAK	Napa Valley
1970														
Base	$ 0.25	$ 0.25				n.a.	n.a.	$ 0.50	$ 0.33			n.a.		
High		$ 0.80							$ 0.67					
1975														
Base	$ 0.25	$ 0.30	$ 0.25	$ 0.25	$ 0.25	n.a.	$ 0.35	$ 0.50	$ 0.35	n.a.	$ 0.25	n.a.		
High		$ 1.40	$ 1.45	$ 0.50			$ 1.50		$ 0.71					
1980														
Base	$ 0.50	$ 0.50	$ 0.35		$ 0.35	$ 0.25	$ 0.35	$ 1.50	$ 0.71	$ 0.25	$ 0.35	n.a.		
High		$ 1.50	$ 1.50		$ 0.75	$ 1.25	$ 2.50	$ 2.00	$ 1.47	$ 0.50				
1985														
Base	$ 0.60	$ 0.60	$ 0.60	$ 0.60	$ 0.60	$ 0.35	$ 1.00	$ 2.10	$ 0.86	$ 0.60		n.a.		
High		$ 1.75	$ 2.15	$ 0.90	$ 1.00	$ 1.35	$ 3.30	$ 2.50	$ 1.80					
1990														
Base	$ 0.85	$ 1.00	$ 0.80	$ 0.75	$ 0.75	$ 0.50			$ 0.86	$ 0.60				n.a.
High	$ 2.00	$ 2.00	$ 3.00	$ 1.15	$ 1.00	$ 1.95			$ 1.92					
1995														
Base	$ 1.00	$ 1.25	$ 0.90		$ 1.10	$ 1.00	$ 1.25		$ 0.73	$ 1.00	$ 1.00	$ 6.36		$ 1.00
High	$ 2.00	$ 2.20	$ 3.55		$ 2.25	$ 2.50	$ 4.50		$ 3.64	$ 1.25	$ 2.00			$ 2.50
1996														
Base			$ 1.00		$ 1.10		$ 1.25	$ 2.50						
High			$ 4.00		$ 2.25		$ 4.50	$ 4.25						
1997														
Base			$ 1.10	$ 1.10					$ 0.77					
High			$ 4.70	$ 1.65					$ 3.83					
1998														
Base									$ 0.80			$ 3.33		
High									$ 4.02					

MUNI : High fare is for cable cars.
Benicia: High fare is for patrons travelling between Vallejo and Contra Costa County
Vallejo Ferry is monthly pass divided by 42 rides.
SamTrans: High fare is for all express routes, except 1F/19F
Oakland/Alameda Ferry: Prices are per trip cost of 10-ticket book (1990)

Table 5 (continued)
History of Transit Fares in Bay Area, 1970-1998

	Napa City	Tri-Delta	Benicia	Union City	LAVTA	30-Z	DB	WestCat	CityCoach (Vaca)	Flyer (Fairfld)	Oak/Ala Ferry	Sta Rosa City Bus	Sonoma County	Petaluma
1970														
Base														
High														
1975														
Base	$ 0.25	$ 0.25										$ 0.25		$ 0.25
High														
1980														
Base	$ 0.35	$ 0.25			$ 0.50			$ 0.60				$ 0.35	$ 0.35	
High														
1985														
Base		$ 0.50		$ 0.50		$ 0.60	$ 1.25					$ 0.60		
High						$ 0.85	$ -							
1990														
Base	$ 0.60	$ 0.60	$ 0.75	$ 0.75	$ 0.60	$ 1.00	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 2.50			
High			$ 1.50				$ 1.50							
1995														
Base	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 1.00			$ 0.75				$ 0.85	$ 1.05	$ 1.05
High			$ 1.50											
1996														
Base		$ 0.75												
High														
1997														
Base							$ 0.75				$ 2.75	$ 1.00		
High							$ 1.75							
1998														
Base							$ 1.00							
High							$ 2.00							

MUNI : High fare is for cable cars.
Benicia: High fare is for patrons travelling between Vallejo and Contra Costa County
Vallejo Ferry is monthly pass divided by 42 rides.
SamTrans: High fare is for all express routes, except 1F/19F
Oakland/Alameda Ferry: Prices are per trip cost of 10-ticket book (1990)

Figure 4.1
San Francisco Municipal Railway (Muni)
Base Fare: Historical and Projected

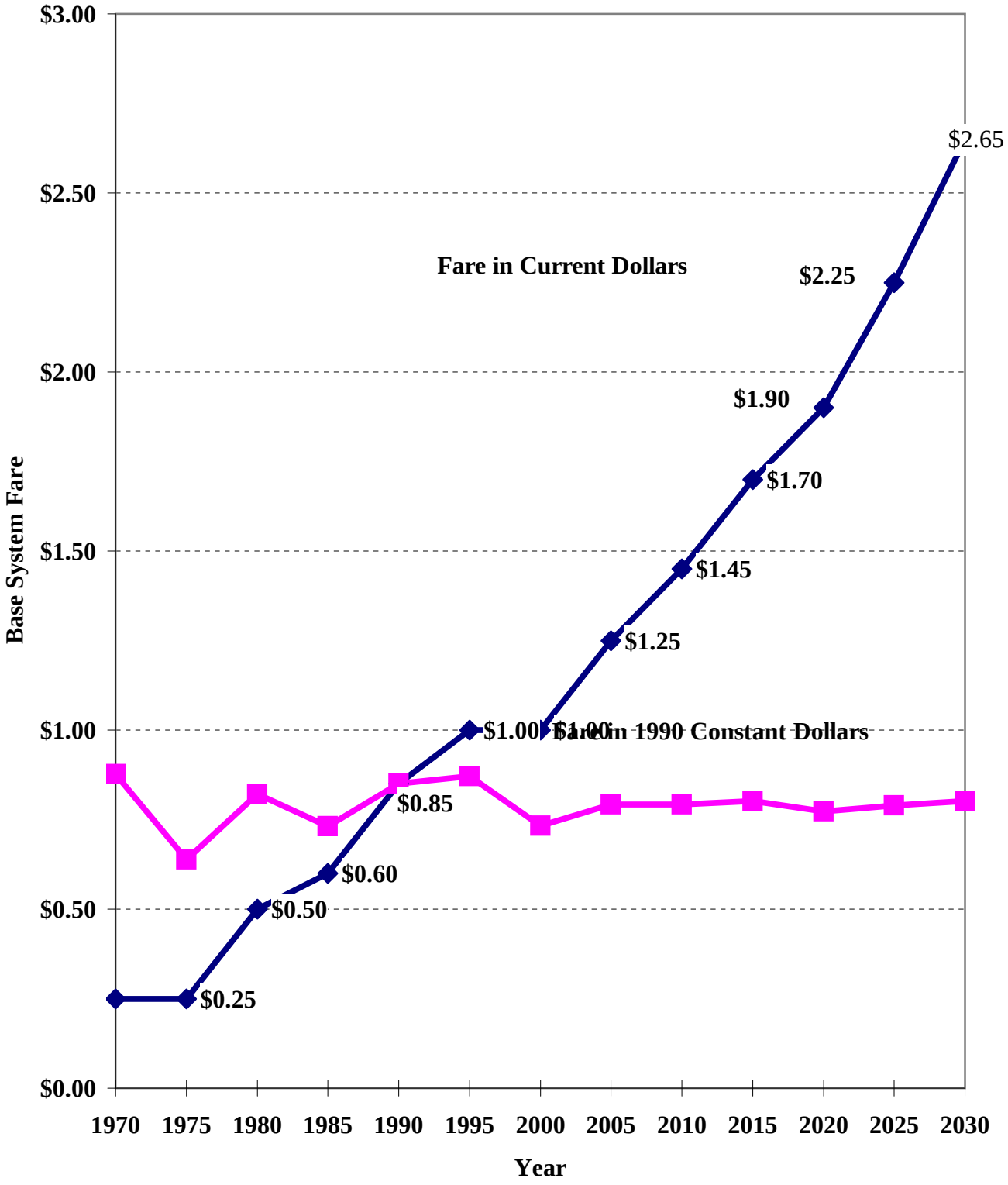

Figure 4.2
A.C. Transit District
Base Fare: Historical and Projected

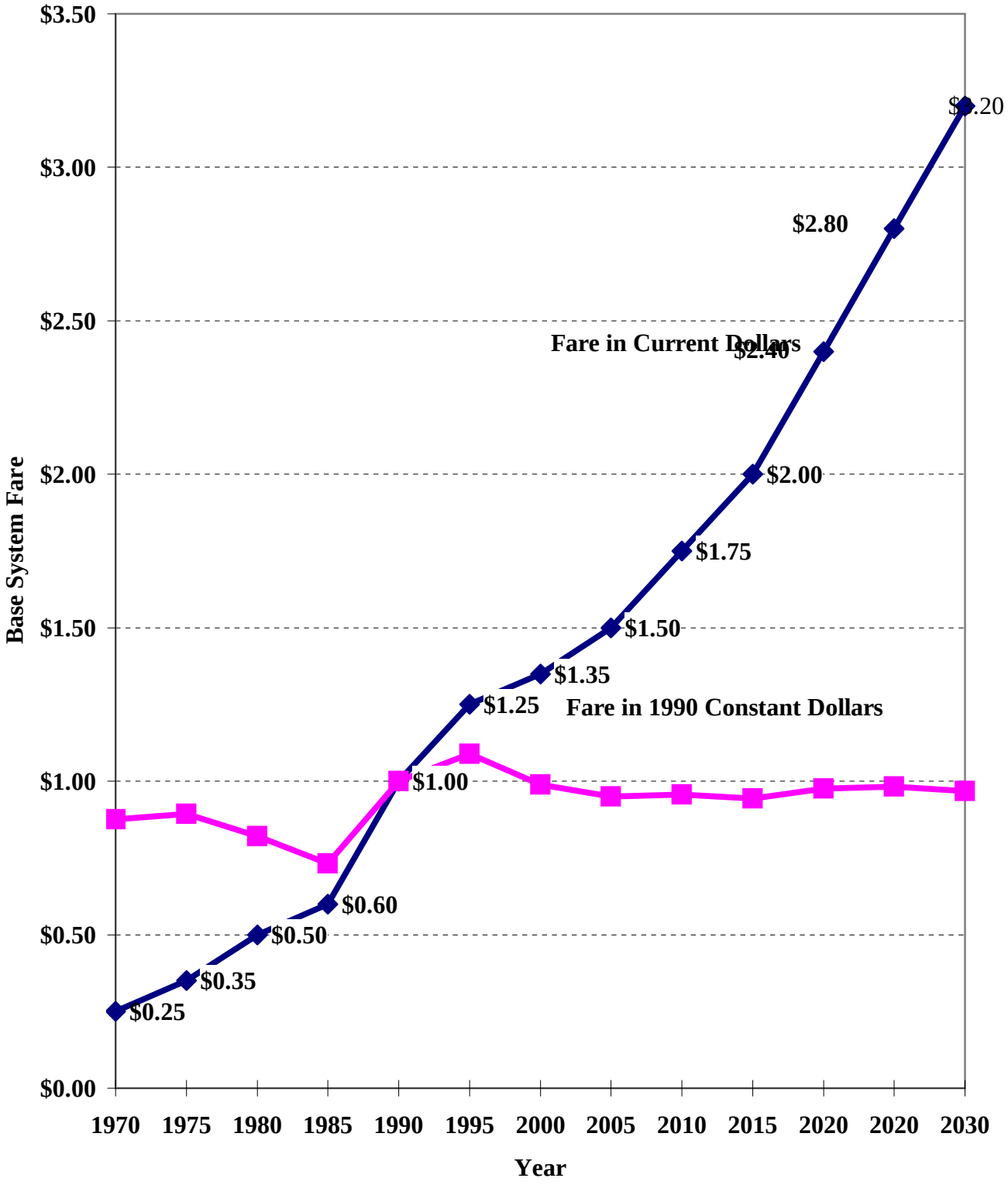

Figure 4.3
Bay Area Rapid Transit District (BART)
Base Fare: Historical and Projected

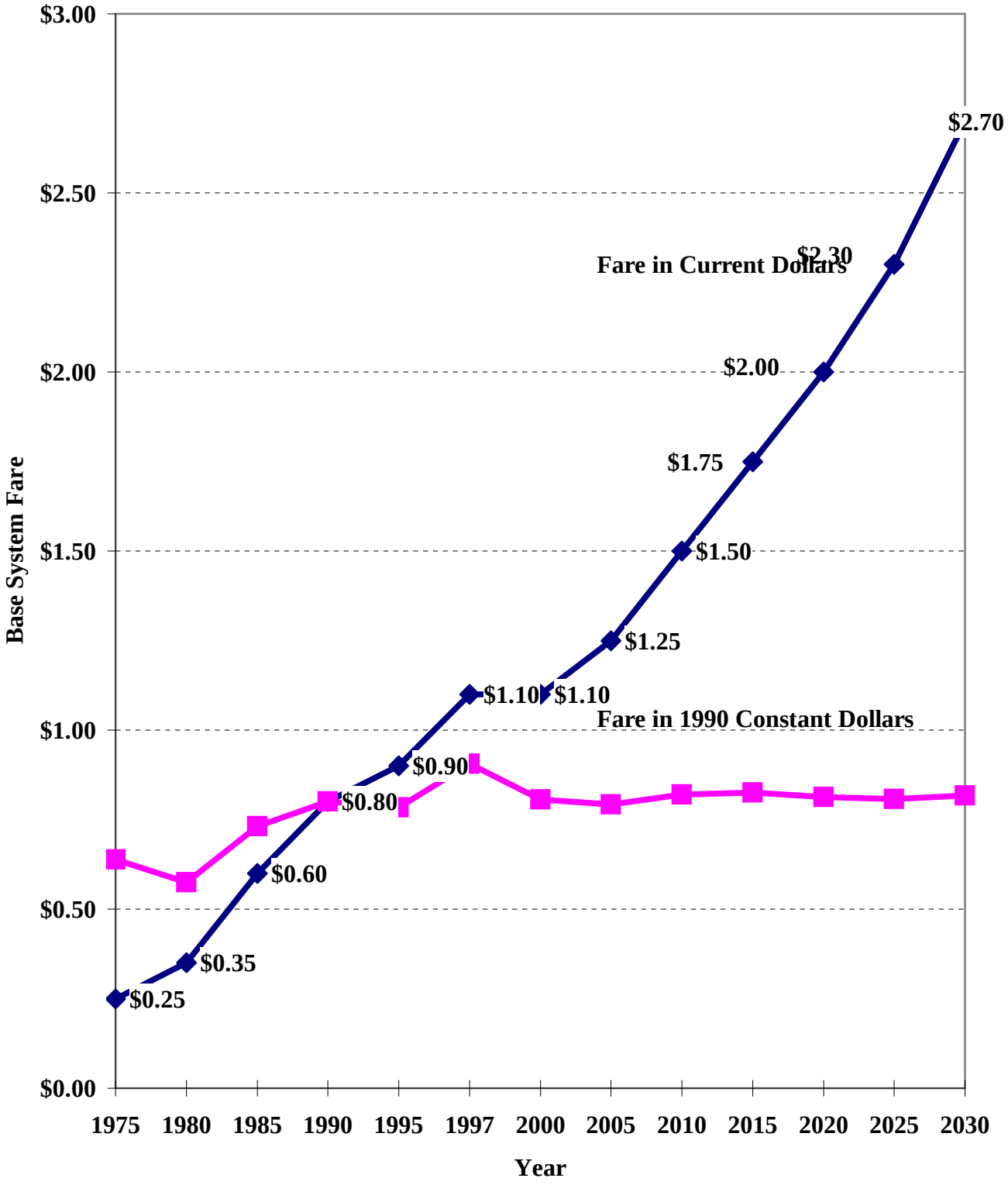

Table 6.1
Regional Highway Peaking Factors for AM and PM Peak Hours
"Old-Style" MTCFCAST Model System

AM/PM Peak Hour Trip Purpose	Trip Direction	1965 Survey	1981 Survey	1990 Survey	All Forecasts
AM Peak Hour Factors					
Home-Based Work	H –> W	0.17021	0.15656	0.15436	NA
Weighted Average	W –> H	0.00462	0.00483	0.00329	NA
Home-Based Non-Work	H –> NW	0.03162	0.04146	0.05319	0.04476
	NW –> H	0.01261	0.01459	0.01549	0.01576
Non-Home-Based	NW –> NW	0.02077	0.02404	0.02797	0.02404
HBW Drive Alone	H –> W	NA	0.14597	0.14418	0.14597
	W –> H	NA	0.00514	0.00352	0.00514
HBW Shared Ride 2+	H –> W	NA	0.17763	0.18514	0.17763
	W –> H	NA	0.00172	0.00158	0.00172
PM Peak Hour Factors					
Home-Based Work	H –> W	0.00686	0.00801	0.00788	NA
Weighted Average	W –> H	0.15601	0.12637	0.12533	NA
Home-Based Non-Work	H –> NW	0.03162	0.03528	0.02769	0.03626
	NW –> H	0.05506	0.06155	0.05050	0.06325
Non-Home-Based	NW –> NW	0.08814	0.08388	0.08207	0.08388
HBW Drive Alone	H –> W	NA	0.00790	0.00837	0.00790
	W –> H	NA	0.12661	0.12612	0.12661
HBW Shared Ride 2+	H –> W	NA	0.00857	0.00661	0.00857
	W –> H	NA	0.13595	0.12066	0.13595
Bay Bridge Spread Peak Factor		NA	NA	NA	0.62000
Ala/SC Spread Peak Factor		NA	NA	NA	0.70000

Table 6.2
Regional Highway Peaking Factors for AM and PM Peak Periods
"New-Style" BAYCAST Model System

AM/PM Peak Period Trip Purpose	Trip Direction	1990 Survey	All Forecasts
AM Peak Period Factors (0700-0900)			
Home-Based Work	H –> W	*0.26974 **	*0.26974 **
Weighted Average	W –> H	0.00661	0.00661
Home-Based Non-Work	H –> NW	0.06662	0.06662
(HBSH, HBSR)	NW –> H	0.02719	0.02719
Home-Based School	H –> School	0.28402	0.28402
	School –> H	0.01141	0.01141
Non-Home-Based	NW –> NW	0.05679	0.05679
HBW Drive Alone	H –> W	*0.25530 **	*0.25530 **
	W –> H	0.00707	0.00707
HBW Shared Ride 2+	H –> W	*0.31213 **	*0.31213 **
	W –> H	0.00421	0.00421
PM Peak Period Factors (1600-1800)			
Home-Based Work	H –> W	0.01584	0.01584
Weighted Average	W –> H	0.20792	0.20792
Home-Based Non-Work	H –> NW	0.06230	0.06230
(HBSH, HBSR)	NW –> H	0.10329	0.10329
Home-Based School	H –> School	0.02684	0.02684
	School –> H	0.05724	0.05724
Non-Home-Based	NW –> NW	0.14901	0.14901
HBW Drive Alone	H –> W	0.01644	0.01644
	W –> H	0.20856	0.20856
HBW Shared Ride 2+	H –> W	0.01529	0.01529
	W –> H	0.20548	0.20548

** Factors for AM peak period home-to-work trips are for illustrative use only. HBW departure time choice model is used in model application.*

Table 7
Year 1990 AM Peak Period Calibration Factors ("Peak Spreading Factors"), Superdistrict-to-Superdistrict

	To:																															
From	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**
1	--	--	--	--	0.60	0.60	0.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	0.60	0.60	0.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	0.60	0.60	0.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	0.60	0.60	0.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	0.65	0.65	0.65	0.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	0.65	0.65	0.65	0.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7	0.65	0.65	0.65	0.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	0.70	0.70	0.70	0.70	0.30	0.30	0.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9	0.70	0.70	0.70	0.70	0.45	0.45	0.45	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	0.70	0.70	0.70	0.70	0.45	0.45	0.45	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15	--	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
16	--	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
17	--	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
18	--	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
19	--	--	--	--	--	--	--	--	0.70	0.70	0.70	0.70	0.70	0.70	--	0.40	0.40	0.40	0.40	0.70	0.70	0.70	0.70	0.70	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
20	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.32	0.32	0.32	0.32	--	--	--	--	--	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
21	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	0.70	0.70	0.70	0.70	0.70	0.70	0.48	0.80	0.80	0.80	0.80	--	--	--	--	--	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
22	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	0.70	0.70	0.70	0.70	0.70	0.70	0.48	0.80	0.80	0.80	0.80	--	--	--	--	--	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
23	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	0.70	0.70	0.70	0.70	0.70	0.70	0.48	0.80	0.80	0.80	0.80	--	--	--	--	--	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
24	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	0.70	0.70	0.70	0.70	0.70	0.70	0.48	0.80	0.80	0.80	0.80	--	--	--	--	--	--	--	--	--	0.80	0.80	0.80	0.80	0.80	0.80
25	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.62	0.70	0.70	0.70	0.70	0.70	0.62	0.62	0.62	0.62	--	--	--	--	0.50	0.50	0.50	--	--	--
26	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.62	0.70	0.70	0.70	0.70	0.70	0.62	0.62	0.62	0.62	--	--	--	--	0.50	0.50	0.50	--	--	--
27	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.62	0.70	0.70	0.70	0.70	0.70	0.62	0.62	0.62	0.62	0.40	0.40	--	--	--	--	--	0.40	0.40	0.40
28	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.62	0.70	0.70	0.70	0.70	0.70	0.62	0.62	0.62	0.62	0.40	0.40	--	--	--	--	--	0.40	0.40	0.40
29	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.40	0.40	--	--	--	--	--	0.40	0.40	0.40
30	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.40	0.40	--	--	--	--	--	0.40	0.40	0.40
31	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.40	0.40	--	--	--	--	--	0.40	0.40	0.40
32	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	--	--	--	--	--	--	--	--	--	--
33	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	--	--	--	--	--	--	--	--	--	--
34	0.70	0.70	0.70	0.70	0.70	0.70	0.70	--	--	--	--	--	--	--	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	--	--	--	--	--	--	--	--	--	--

Table 8
Regional Work and Non-Work Trip Vehicle Occupancies
Historical and Projected

	Household Surveys			Model Simulation	
Trip Purpose	1965	1981	1990	2000	2030
Home-Based Work	1.180	1.129	1.095†	1.099*	1.109*
Home-Based Shop	1.443	1.241	1.416§	1.368*	1.361*
Home-Based Social / Rec	1.813	1.730	1.584§	1.547*	1.552*
Home-Based School	2.782	2.234	2.373§		
Home-Based Grade School			NA	NA	NA
Home-Based High School			3.205§	4.317*	4.145*
Home-Based College			1.164§	1.272*	1.318*
Non-Home-Based	1.445	1.254	1.206§	1.228*	1.231*
Total Trips	1.440	1.303	1.299§	1.341*	1.328*

1965, 1981 and 1990 vehicle occupancy rates derived from household travel surveys.
** Regional Model Simulation using BAYCAST system, not assumed.*
† Source: 1990 Census-based Observed Home-Based Work trips.

Standard Vehicle Occupancy Assumptions:
Drive Alone = 1.0 persons per vehicle
Shared Ride 2 = 2.0 persons per vehicle
Shared Ride 3+ = 3.5 persons per vehicle

Note: The vehicle occupancy rates for home-based shop and social/recreation trips are based on vehicle driver vs. vehicle passenger data from the 1965 and 1981 surveys. For the 1990 survey, the vehicle occupancy rates are based on drive alone, shared ride 2 and shared ride 3+ data. The vehicle occupancy data from the three household survey datasets are not strictly comparable, given the incomplete information on vehicle occupants obtained from household travel surveys.

Table 9
Ratio of Gas Prices in San Francisco and Los Angeles

		San Francisco	Los Angeles	Ratio SF/LA	Difference SF - LA
January	2001	$1.760	$1.609	1.09	$0.151
February	2001	$1.758	$1.666	1.06	$0.092
March	2001	$1.830	$1.708	1.07	$0.122
April	2001	$1.943	$1.826	1.06	$0.117
May	2001	$2.035	$2.067	0.98	-$0.032
June	2001	$2.006	$2.049	0.98	-$0.043
July	2001	$1.883	$1.896	0.99	-$0.013
August	2001	$1.709	$1.650	1.04	$0.059
September	2001	$1.856	$1.670	1.11	$0.186
October	2001	$1.758	$1.529	1.15	$0.229
November	2001	$1.638	$1.347	1.22	$0.291
December	2001	$1.419	$1.158	1.23	$0.261
January	2002	$1.325	$1.237	1.07	$0.088
February	2002	$1.313	$1.383	0.95	-$0.070
March	2002	$1.492	$1.585	0.94	-$0.093
April	2002	$1.679	$1.693	0.99	-$0.014
May	2002	$1.638	$1.657	0.99	-$0.019
June	2002	$1.667	$1.658	1.01	$0.009
July	2002	$1.698	$1.673	1.01	$0.025
August	2002	$1.680	$1.684	1.00	-$0.004
September	2002	$1.662	$1.677	0.99	-$0.015
October	2002	$1.632	$1.619	1.01	$0.013
November	2002	$1.703	$1.666	1.02	$0.037
December	2002	$1.667	$1.613	1.03	$0.054
January	2003	$1.744	$1.693	1.03	$0.051
February	2003	$1.950	$1.878	1.04	$0.072
March	2003	$2.186	$2.165	1.01	$0.021
April	2003	$2.149	$2.122	1.01	$0.027
May	2003	$1.952	$1.879	1.04	$0.073
June	2003	$1.875	$1.766	1.06	$0.109
July	2003	$1.907	$1.737	1.10	$0.170
August	2003	$1.968	$1.917	1.03	$0.051
September	2003	$2.139	$2.083	1.03	$0.056
October	2003	$1.897	$1.889	1.00	$0.008
November	2003	$1.750	$1.757	1.00	-$0.007
December	2003	$1.667	$1.715	0.97	-$0.048
				37.31	
				1.04	

Table 10
2025 Tolls on Bay Area Bridges

All Alternatives

Bridge	Share of Discounted Tolls	Full Price Toll (2025 $)	Discounted Toll (2025 $)	Average Toll (2025 $)	Average Toll (1990 $)	Avg. Toll / 2 (1990$)
Benicia	0%	$3.00	$3.00	$3.00	$1.05	$0.53
Carquinez	0%	$3.00	$3.00	$3.00	$1.05	$0.53
San Rafael	0%	$3.00	$3.00	$3.00	$1.05	$0.53
Golden Gate	0%	$3.00	$3.00	$3.00	$1.05	$0.53
Bay Bridge	0%	$3.00	$3.00	$3.00	$1.05	$0.53
San Mateo	0%	$3.00	$3.00	$3.00	$1.05	$0.53
Dumbarton	0%	$3.00	$3.00	$3.00	$1.05	$0.53
Antioch	0%	$3.00	$3.00	$3.00	$1.05	$0.53

CPI: 1990=406.0; 2025=1157.1; Ratio 0.3509

Table 11
Speed/Capacity Table (With Revised Speeds)
San Francisco Bay Area Regional Highway Networks

Area Type	Facility Type								Speed Class*	
	Frwy-to-Frwy (1)	Freeway (2)	Expwy (3)	Collector (4)	Fwy Ramp (5)	Dummy (6)	Major Arterial (7)	Metered Ramp (8)	Special (9)	Special (10)
Core (0)	1,700 40	1,850 55	1,300 40 (25)	550 10 (5)	1,300 30 (25)	N.A.	800 20 (15)	700 25 (20)	1,900 (A) 55	1,350 (G) 40 (25)
CBD (1)	1,700 40	1,850 55	1,300 40 (25)	600 15 (10)	1,300 30 (25)	N.A.	850 25 (20)	700 25 (20)	1,950 (B) 60	1,500 (H) 45 (30)
UBD (2)	1,750 45	1,900 60	1,450 45 (30)	650 20 (15)	1,400 35 (30)	N.A.	900 30 (25)	800 30 (25)	2,000 (C) 65	1,530 (I) 55 (40)
Urban (3)	1,750 45	1,900 60	1,450 45 (30)	650 25 (20)	1,400 35 (30)	N.A.	900 30 (25)	800 30 (25)	1,780 (D) 50	900 (J) 25 (20)
Suburb.(4)	1,800 50	1,950 65	1,500 50 (35)	800 30 (25)	1,400 40 (35)	N.A.	950 35 (30)	900 35 (30)	1,800 (E) 45	950 (K) 30 (25)
Rural (5)	1,800 50	1,950 65	1,500 55 (40)	850 35 (30)	1,400 40 (35)	N.A.	950 40 (35)	900 35 (30)	1,840 (F) 50	980 (L) 40 (35)

Upper Entry: Capacity at Level of Service "E" in vehicles per hour per lane, i.e., ultimate capacity

Lower Entry: Free-Flow Speed (miles per hour)

* Speed Class = (Area Type * 10) + Facility Type

N.A. = Not Applicable

Notes:

(A) TOS Fwy (AT=0,1); (B) TOS Fwy (AT=2,3); (C) TOS Fwy (AT=4,5); (D) Golden Gate; (E) TOS Fwy-to-Fwy (AT=0-3); (F) TOS Fwy-to-Fwy (AT=4,5)

(G) Expwy TOS (AT=0,1); (H) Expwy TOS (AT=2,3); (I) Expwy TOS (AT=4,5); (J) Art.Sig.Coor. (AT=0,1); (K) Art.Sig.Coor. (AT=2,3); (L) Art.Sig.Coor. (AT=4,5)

Speed values in parentheses are used in MTC speed post-processing routine, now considered the "main processing" routine.

Table 12
Distribution of Average Weekday Daily Vehicle Miles of Travel (VMT)
by Average Link Speed (mph)
13 Speed Cohorts used in ARB BURDEN Models
Forecasts Prepared for the Update of the 2007 Transportation Improvement Program
and Transportation 2030 Plan Amendment

		2000 Base Year		2015 Intermediate Year		2030 RTP Forecast	
	Speed Cohort	VMT	% of Total	VMT	% of Total	VMT	% of Total
1	< 7.5 mph	1,607,270	1.1%	166,819	0.1%	400,408	0.2%
2	7.5 - 12.5 mph	768,811	0.5%	961,693	0.6%	2,198,410	1.1%
3	12.5 - 17.5 mph	8,617,212	6.0%	10,009,928	5.9%	13,544,239	6.6%
4	17.5 - 22.5 mph	10,430,867	7.3%	10,455,166	6.2%	14,738,268	7.2%
5	22.5 - 27.5 mph	20,688,657	14.4%	22,295,796	13.2%	27,743,813	13.6%
6	27.5 - 32.5 mph	15,699,998	10.9%	17,618,795	10.4%	22,956,378	11.2%
7	32.5 - 37.5 mph	11,969,989	8.3%	15,461,563	9.1%	18,560,367	9.1%
8	37.5 - 42.5 mph	3,756,947	2.6%	6,870,477	4.1%	7,560,369	3.7%
9	42.5 - 47.5 mph	5,457,459	3.8%	5,363,832	3.2%	6,986,231	3.4%
10	47.5 - 52.5 mph	5,376,444	3.7%	5,976,691	3.5%	5,621,091	2.8%
11	52.5 - 57.5 mph	5,699,263	4.0%	7,211,141	4.3%	6,621,044	3.2%
12	57.5 - 62.5 mph	27,966,485	19.4%	31,988,635	18.9%	35,468,232	17.4%
13	> 62.5 mph	25,762,334	17.9%	34,960,021	20.6%	41,763,429	20.5%
	TOTAL	143,801,736	100.0%	169,340,557	100.0%	204,162,280	100.0%

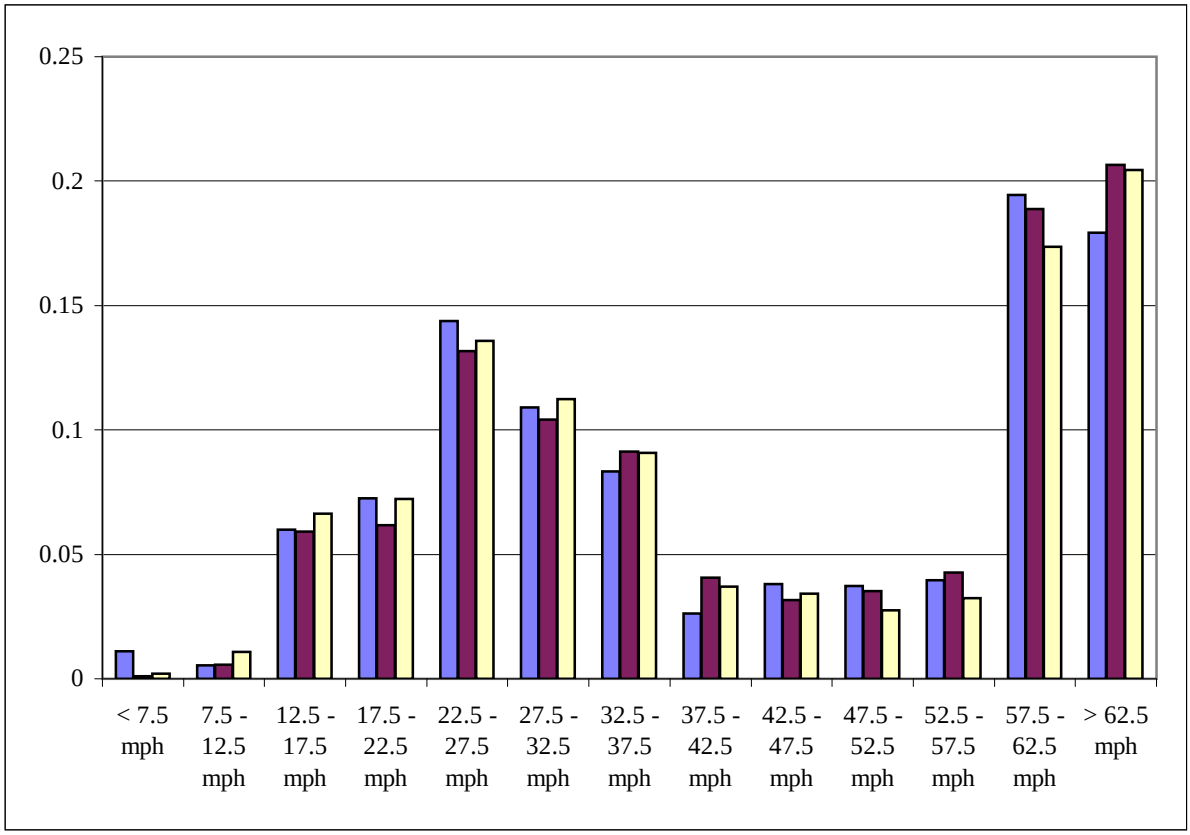

Table 13
Changes in Transit Operator Base Fares, 1998 to 2006

Operator	1998 Fare	2001 Fare	2004 Fare	2006 Fare	Percent Change, 2001-2006
Muni	$1.00	$1.00	$1.25	$1.50	50.0%
BART	$1.10	$1.10	$1.25	$1.40	27.3%
AC Transit	$1.25	$1.35	$1.50	$1.75	29.6%
SCVTA-Local	$1.10	$1.25	$1.50	$1.75	40.0%
SCVTA-Express	$1.75	$2.00	$3.00	$3.50	75.0%
SamTrans	$1.00	$1.10	$1.25	$1.50	36.4%
Golden Gate (Marin)	$1.25	$1.50	$1.80	$2.00	33.3%
Golden Gate (Sonoma)	$1.75	$2.15	$2.45	$2.85	32.6%
Caltrain	$1.11	$1.11	$1.50	$2.25	102.7%
CCCTA	$1.00	$1.25	$1.50	$1.75	40.0%
Vallejo	$1.00	$1.25	$1.35	$1.50	20.0%
Tri-Delta	$0.75	$0.75	$1.00	$1.00	33.3%
WHEELS (LAVTA)	$1.00	$1.00	$1.25	$1.25	25.0%

Notes:

1. For the 1998 RTP, fares as of February 1998 were used. For the 2001 RTP, fares as of May 2001 were used. For the 2005 RTP/TIP, fares as of March 2004 will be used.
2. Transit fares are from MTC records, and the Web site: http://www.transitinfo.org/
3. Caltrain fares are based on a 10-ride ticket book.
4. LAVTA increased adult fares to $1.25 on 11/1/01.
4. Golden Gate Transit fares shown are for intra-Marin and intra-Sonoma counties. Golden Gate Transit District increased fares on an annual basis between 1999-2001. The fare increases of 7/1/00 were used in the 2001 RTP.